Examination of the link between music and adoption rates at an animal shelter

Honors Research Thesis

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ABSTRACT

Changing the way in which a dog behaves in a shelter environment can directly influence the likelihood of that dog being adopted. Previous research has found that playing classical music in a shelter setting can encourage a dog to perform positive behaviors; however, no studies have examined the impact of music on adoption rate. This study consisted of three separate six-day trials; 72 total dogs participated in the study at Columbus Humane, a shelter located in Columbus, Ohio. During each trial, three treatments (classical music, pop music, and control) were tested. Behavioral scans were completed during each trial to record occurrence of undesirable behavior (vocalization, jumping, pacing, aversions). At the end of the experiment, records from Columbus Humane were analyzed to determine adoption rate during each trial. Vocalizations were most frequent in rooms playing classical music. No other differences in behavior were noted. Adoption rates were greatest in classical and pop music treatment rooms, respectively, compared to control rooms but no differences were noted in adoption rates between classical and pop music treatments. This study highlights auditory enrichment as a factor that influences adoption rates for dogs housed at shelters and a potential resource to be utilized in shelter settings to improve adoptability.

BODY

Introduction

Each year, 3.3 million dogs are surrendered to animal shelters across the country. Of these, approximately 1.6 million (48%) will be adopted and 670,000 (20%) will be euthanized due to lack of adoptions (*ASPCA*, 2017). Previous research has shown that in-kennel behavior of the dogs has a greater impact on potential adopters than physical characteristics or breed (Wells and Hepper, 1992; Protopopova et al, 2014). Recent studies of the effects of behavior on length

of stay have been able to pinpoint major behaviors affecting choice to adopt. Protopopova et al, (2014) demonstrated that potential adopters react most negatively to dogs that are leaning on kennel walls, facing away from the kennel door, and moving back and forth inside the kennel; all these behaviors are associated with longer stay time in a shelter. A study by Wells and Hepper (1992) found that barking is a negative behavioral cue that deters potential adopters.

One approach to mitigating negative behavior among shelter dogs is to influence the environment of the shelter through enrichment. Wells and Hepper (2000) demonstrated that environmental enrichment can have a positive impact on the behavior of shelter dogs. The addition of furniture and toys to the kennel increased social behavior and time spent at the front of the kennel, decreased time pacing and barking, and increased adoption rates (Wells and Hepper, 2000).

Researchers have started to evaluate the effect of auditory enrichment on animal behavior and welfare. Notably, music has been shown to increase onset of milk letdown in dairy cows (Uetake et al, 1997). It is thought the classical music played in the milking parlor had a calming effect on the cattle. Recently, this research has been applied to eliciting positive behaviors in other species, including dogs. Kogan et al (2012), compared behavioral reactions of dogs to various music types. They found the dogs had the most adverse behavioral reaction (increased shaking and pacing) when exposed to heavy metal music and the most positive behavioral reaction (laying down and not barking) when exposed to classical music, specifically Beethoven's "Moonlight Sonata." This study concluded that classical music may improve behavior by relieving stress inflicted by the kennel environment (Kogan et al, 2012). A later study by Bowman, et al (2015) demonstrated that dogs displayed more relaxed behavior (less

barking and more time laying down) when exposed to classical music and salivary cortisol levels were slightly lower when exposed to classical music, although not significantly.

In a more recent research study, Engler and Bain (2017) examined the effects of classical music played at the University of California, Davis veterinary teaching hospital examination rooms. They used treatments of control, traditional classical music, and *Through a Dog's Ear*, classical music especially formulated to have a soothing effect on dogs. The music in *Through a Dog's Ear* is supposedly designed to fit the unique way a dog hears compared to a human, so the music may have a stronger effect on the dog. The study did not find a significant difference in canine behavior as perceived by veterinarian or owner during the hospital visit. The study did find that exposure to any type of music led to significantly greater owner satisfaction; the veterinarians participating in the study also noted that music made the work environment more enjoyable (Engler and Bain, 2017).

As evidenced above, previous research has identified positive links between the use of music and the display of positive, relaxed behavior by shelter dogs. While studies show that positive behaviors reduce time in shelter and music influences dog behavior, to my knowledge no studies have examined the association of music on adoption rate. This study aimed to directly examine the possibility of a link between use of musical enrichment in shelters and increased adoption rates. It was believed that the presence of music in the kennel rooms would have a positive impact on canine behavior and adoption rates. Based on previous research findings, it is possible that classical music may lead to a greater display of positive canine behavior and, subsequently, greater adoption rates.

Materials and Methods

The subjects of this study were dogs (n=72) available for adoption at Columbus Humane (formerly the Capital Area Humane Society) in Columbus, Ohio, and were studied from Wednesday, November 15, 2017, until Monday, December 11, 2017. The dogs came to Columbus Humane through four possible pathways: owner surrender, transfer from other facilities, natural disaster rescue transfers, or the Cruelty Investigations Department. For dogs acquired through owner surrender, the owner first met with Columbus Humane staff to discuss their situation and their dog's health and behavior history before the surrender was finalized. All dogs were evaluated medically and, those over 6 months of age, with a SAFER assessment to confirm they were okay to enter the adoption floor. The SAFER assessment uses multiple tests to elicit responses from the dog in question; these responses are used to predict future behavior and probability of showing aggression (*Halifax Humane Society*, 2018). Each dog passed the SAFER assessment and medical examination and was deemed fit for the adoption floor by Columbus Humane staff. The dogs were housed in three separated adoption rooms, with up to seven dogs to a room at any given time (see Figure 1). Each room was equipped with windows to allow public viewing from the outside atrium. Each kennel was provided food and water bowls, a bed, and toys for the dogs. Volunteers were present throughout each day to walk and play with the dogs to provide physical exercise and mental stimulation.

Figure 1: Diagram of adoption room (all three adoption rooms identical in layout). Seven kennels (six equal in size and one larger) located in central square; kennels doors at top and bottom of central square; left and right sides of central square are solid walls, as are the divisions between kennels. Tan flooring represents central lobby of the shelter. Music played on CD player located on white table in

Each room was exposed to one of three possible treatments (classical, pop, or control) during each trial period (for music selections, see Appendix A). Treatments were rotated between each trial following the protocol laid out in Table 1. Music was played during adoption hours (Monday to Friday 2-7pm; Saturday and Sunday 12-5pm) for a total of 6 continuous days. Each trial started at shelter opening on Wednesday and ended at closing the following Monday. Music was played on a standard CD Player at a medium volume.

Table 1: Treatment allocation by room and trial

	Trial One	Trial Two	Trial Three
Room One	Classical	Pop	Control
Room Two	Pop	Control	Classical
Room Three	Control	Classical	Pop

Three-minute behavioral scans were performed four of the six trial days; all three rooms were observed for 30 seconds per side and this was repeated for a total of three observations. Every scan was performed by the same researcher. Scans were typically done on Wednesday, Thursday, Sunday, and Monday in the late afternoon. Dogs were monitored for four behaviors jumping, pacing, vocalization, and aversion. The occurrence of all four behaviors was totaled for each individual room. Jumping was defined as the dog jumping upward to place its paws on the kennel door; pacing as the dog moving back and forth across the kennel at least twice; vocalizing as the dog barking or growling; and aversion as the dog positioning itself to the back of the kennel, away from the door. These behaviors were chosen as they have been found to negatively impact adoptions in previous research (Wells and Hepper, 1992; Protopopova et al, 2014).

Adoption information for each of the trial rooms was received from shelter records at the end of the project.

All protocols were approved prior to the start of the project by The Ohio State University Institutional Animal Care and Use Committee (IACUC).

Statistical Analysis

The project consisted of three six-day trials and three treatments (classical, pop, and control). Data from behavior scans and adoption records was analyzed using the Proc Mixed analysis in the Statistical Analysis System. Class variables included trial, day, and treatment; fixed effects were treatment and trial. Values are given as mean ± standard deviation; $P<0.05$ was considered significant.

Results

Behavior

There was no significant difference in jumping or aversion behaviors between trial or treatment ($P>0.05$). There was a difference in vocalization between both trial ($P=0.01$) and treatment ($P=0.01$). Vocalization was most frequent in Trial 1 (10.3 ± 1.4) compared to Trial 2 (5.3 ± 1.4) and Trial 3 (4.1 ± 0.25; $P<0.02$). Classical music had a greater vocalization frequency compared to pop music (Classical 8.9 ± 1.5; Pop 4.2 ± 1.4) but there was no difference when compared to the control group. Pacing frequency was most frequent in Trial 1 (2.0 ± 0.46) compared with Trial 2 (1.18 ± 0.42) and Trial 3 (0.19 ± 0.51; $P< 0.01$). There was no effect of treatment on pacing behavior.

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Adoption Rates

Trial influenced adoption rates; Trial 1 had the greatest number of adoptions (2.0 ± 0.3), compared to Trials 2 (1.7 ± 0.3) and 3 (0.33 ± 0.3; P<0.0001).

Treatment also influenced adoption rates. Adoption rates were the highest in the classical room (2.0 ± 0.2) compared to the pop room (1.7 ± 0.2) and control room (0.3 ± 0.2). In comparing among all three, classical had the greatest difference in adoptions when compared to the control room (P<0.001). Pop music also had a greater amount of adoptions than the control room (P<0.002). There was no difference in number of adoptions between the classical and pop rooms (P=0.3).

Significant variation of mean values by trial or by treatment are shown in Figures 2 and 3, respectively, below.

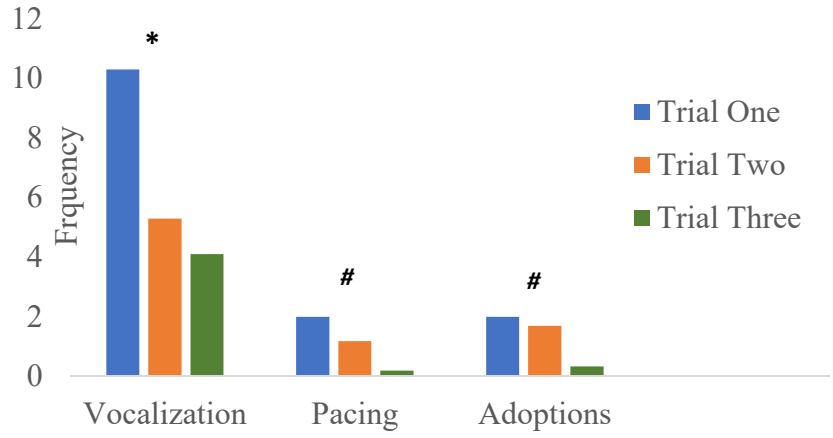

Figure 2 **Vocalization, pacing, and adoption frequency by treatment. (* indicates significant difference between Trial One and Two; # indicates significant difference between Trial One and Three)**

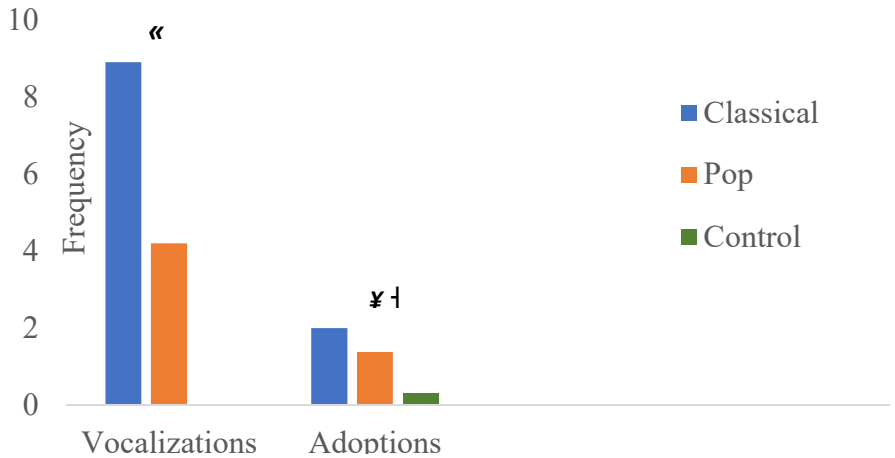

Figure 3 **Graphing of data for mean values of vocalization and adoptions for classical, pop, and control. (« indicates significant difference between Classical and Pop; ¥ indicates significant difference between Classical and Control; ┤ indicates significant difference between Pop and Control)**

Discussion

Treatment and trial period influenced behavior and adoption rates. The difference between barking and pacing among trials shows that each grouping of dogs is unique and will display some behaviors regardless of auditory stimulation. Interestingly, across all three trials, dogs exposed to classical music showed more vocalization than those exposed to pop music. The main difference between the classical and pop music used in this study is the presence of human vocalists in the pop music. It could be that being constantly exposed to human voices habituated the dogs to the sound of people, so they did not react as much to strange voices in the adoption room. The dogs exposed to classical music were not used to hearing human voices and so may have had a reaction to any potential adopters entering the room, leading to a vocalization response. Considering this, those trying to cut down on vocalizations may wish to employ pop music in their efforts.

Barking and pacing were greatest in the first trial and least in the final trial. Surprisingly, adoptions followed a similar trend: greatest in the first trial and least in the final trial. This is the

opposite of what might have been expected. Past research has shown that barking and pacing tend to decrease the likelihood of adoption; here, they do not seem to have had that effect or this effect seems to have been counteracted by another factor.

There was no significant difference in adoption rates between the two musical treatments. A difference was found between each type of music, respectively, and the control treatment. This hints that both classical and pop music can have a positive effect on adoption rates. Based on the behavior results of this study, it is hard to say if the increase in adoption rates was influenced directly by the dogs' behaviors. The lack of difference between jumping and aversion through all trials and treatments limits the effect of those behavior on the results. As discussed above, it seems that adoptions were higher in the music rooms in spite of increased vocalizing and pacing, when we consider that several previous studies have found a negative, not positive, correlation between vocalization, pacing, and adoption rates (Wells and Hepper, 1992; Protopopova et al, 2014).

It is important to remember that canine behavior is only one side of the adoption coin; the adopter is just as important. It is likely that the music influenced the adopters as well as the dogs; perhaps musical preference led adopters to spend more time in certain adoption rooms over others. The ambient effect of the music may have led to a more positive experience in the classical and pop rooms when compared to the control room, similar to the effects of music on pet owners noted by Engler and Bain (2017). Although this study did not do so, future research may wish to focus more on the human side of adoption; a survey of adopters' experience while at the shelter may be beneficial in exploring the influence of music on adoption. It may also prove beneficial to analyze the human demographic visiting and adopting from the shelter; adoptions by treatment could be compared to music preferences within age ranges, family status, etc.

This study was not without its limitations. Unfortunately, records were not available for in-shelter movement of the dogs during the research period. As such, we were not able to account for dogs that changed rooms mid-way through trials or were exposed to different music genres across two trials. Had we analyzed dogs that underwent more than one treatment, we may have better elucidated the individual effect of the music on the dog. We also did not have access to or analyze which of the four possible pathways to the shelter each dog took; again, pathways are owner surrender, transfer from another facility, natural disaster rescue, and the Cruelty Investigations Department. Knowing each dog's background may have given more insight into overall behavior. Both above-mentioned changes may have required counting behavior occurrence by dog rather than by treatment room, as was done in this study.

The number of adoptions per trial could have been influenced by the time of year; Trial One took place prior to Thanksgiving and Trials Two and Three just after the holiday. There is a chance that variation in adoptions by trial may be due to the time of year the trials occurred. Analyzing adoption rates between November 15 and December 6 of previous years may have shed light on that potential connection. Future replications of this research may also consider increasing the length or number of behavior scans and length of individual trials to gather more data and broaden the results. The use of video recording equipment may also be considered to facilitate the collection of behavior data without allowing the dogs to be influenced by the data collector.

Conclusion

This project intended to explore a possible connection between the use of music in shelters and adoption rates. As mentioned above, there were issues with the movement of animals during the study and variations in each individual dog's background. However, the operation of the facility

used in this study, while not completely controlled or ideal, is concurrent with the set-up in the typical American dog shelter. Therefore, it is still thought that significant conclusions can be drawn from the data and applied to other animal shelters. We can conclude that the presence of music in a shelter does have some positive effect on the adoption of shelter dogs. It is not possible to say what role the exact genre of music plays in this connection; however, it does seem that the presence of the music itself has a stronger effect than the type of music used, whether it be classical or pop. Regardless, this study indicates that the use of music may be an ally of shelters when attempting to increase canine adoption rates.

In conclusion, more research is needed to understand the impact of music on both humans and animals. The use of music to create a more positive experience has potential not only in animal shelters but also in other animal facilities such as veterinary hospitals and boarding kennels. This field of research is also critical as a means to improve quality care and customer service in the veterinary field and is a potential resource to be utilized to create a calmer environment in veterinary clinics.

ACKNOWLEDGEMENTS

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REFERENCES

ASPCA. Shelter Intake and Surrender. 2017.

Bowman, A., Scottish SPCA, F.J. Dowell, and N.P. Evans. 2015. "Four Seasons" in an animal rescue centre; classical music reduces environmental stress in kenneled dogs. Physiology & Behavior. 143: 70-82.

Engler, W.J. and M. Bain. 2017. Effect of different types of classical music played at a veterinary hospital on dog behavior and owner satisfaction. Journal of the American Veterinary Medical Association. 251: 195-200.

Halifax Humane Society. Safer Assessment. 2018.

Kogan, L.R., R. Schoenfeld-Tacher, and A.A. Simon. 2012. Behavioral effects of auditory stimulation on kenneled dogs. Journal of Veterinary Behavior: Clinical Applications and Research. 7: 268-275.

Protopopova, A., L.R. Mehrkam, M.M. Boggess, and C.D. Lawrence Wynne. 2014. In-Kennel Behavior Predicts Length of Stay in Shelter Dogs. PLOS ONE.

Uetake, K., J.F. Hurnik, and L. Johnson. 1997. Effect of music on voluntary approach of dairy cows to an automatic milking system. Applied Animal Behaviour Science. (53) 3: 175-182)

Wells, D.L. and P.G. Hepper. 1992. The Behavior of Dogs in a Rescue Shelter. Animal Welfare. (1) 3: 171-186.

Wells, D.L. and P.G. Hepper. 2000. The Influence of Environmental Change on the Behavior of Sheltered Dogs. Applied Animal Behaviour Science. (68) 2: 151-162.

WORKS REVIEWED

Bowman, A., Scottish SPCA, F.J. Dowell, and N.P. Evans. 2017. The effect of different genres of music on the stress levels of kennelled dogs. Physiology & Behavior. 171: 207-215.

Wells, D.L. 2003. A review of environmental enrichment for kennelled dogs, *Canis familiaris*. Applied Animal Behaviour Science. (85) 3-4: 307-317.

Wells, D.L. 2009. Sensory stimulation as environmental enrichment for captive animals: A Review. Applied Animal Behaviour Science. (118) 1-2: 1-11.

APPENDIX A

Classical:

Various artists (2009). Disc one of *Best of Classical: Box Set, 3 CD* [CD]. AAO Music.

Pop:

Various Artists (2017). *Now That's What I Call Music! Volume 62* [CD]. Santa Monica: Universal Music Group and New York: Sony Music Entertainment.